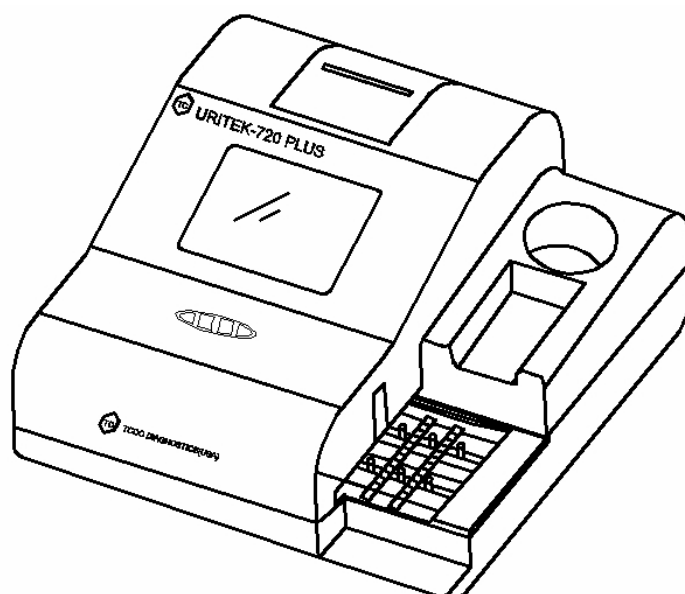


TC-720PLUS

URINE ANALYZER

Operator's Manual



Revision: 10/2007

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WARNING

1. Please read the User's Guide before you operate this analyser. The power requirements comply with Part I of IEC61010-90.
2. Please contact the manufacturer if the analyser does not work properly.
3. Do not look at the optical light source at the opening of the strip placement without eye protection.
4. Do not remove any of the analyser covers without instruction from the manufacturer.
5. Do not touch any of the internal parts of the analyser without the manufacturer's instruction to avoid any possible accidents
6. It is recommended that safety gloves are used when handling and reading urine specimen and test strips.
7. To perform daily cleaning, maintenance, and troubleshooting, safety gloves must be used. Detailed maintenance and precautions are described in Chapter 5.

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CHAPTER 1

INTRODUCTION

The TC-720PLUS urine chemistry analyzer is a semi-automated analyzer for urine chemistry analysis. This analyzer has been manufactured and developed with advanced technology using modern microprocessors, optics and electronics. The TC-720 PLUS uses testing technology utilising a cold-light source, integrating sphere, and modularised blocking systematical design which enhances the stability of the optical system. This system also automatically compensates for the influence of ambient and scattered light through the coordination of software and hardware.

The TC-720PLUS can test for 11 parameters including Glucose (GLU), Urobilinogen (URO), Bilirubin (BIL), Ketones (KET), Specific Gravity (SG), Occult Blood (BLD), pH, Protein (PRO), Nitrite (NIT), Leukocytes (LEU), and Ascorbic Acid (AC) in 60 seconds.

The TC-720PLUS can test the following Urige Test Strips:

URS-2P	URS-4S	URS-7	URS-9
URS-2K	URS-5K	URS-7L	URS-10
URS-3	URS-6	URS-8	URS-11

The TC-720PLUS has the following characteristics:

- LCD Touch screen
- Patient ID profile entry
- Automatically determines patient urine color
- RS-232 Interface
- Temperature indicated on the LCD display
- Easy to Maintain
- Run up to 500 tests / hour
- Contains internal waste tray
- 2000 tests memory
- Results searchable by date or Patient ID number
- Random Test Mode or Continuous Test Mode
- Marks abnormal results
- Primary and Secondary wavelength reading for automatic correction
- The analyzer is only compatible with the Syntron Bioresearch URS line of Urine Strips.



If strips other than Syntron Bioresearch URS are used then results may be inaccurate.

CHAPTER 2

SYSTEM DESCRIPTION

2.1 System Overview

Normal operational conditions

- (1) Power adapter input:: 100-250VA/ 1.0A, 50-60Hz
- (2) Temperature: 10 – 30°C
- (3) Humidity: 75%
- (4) Atmospheric pressure: 70.0 – 106.0 Kpa

Transportation conditions

- (1) Firmly pack in boxes using foam or appropriate packaging materials
- (2) Avoid moisture and keep upright.

Specifications

- (1) Optical measurement: cold light source
- (2) Methods: testing the color change of the strip pads using dual wavelengths
- (3) Measurement wavelengths: 525nm, 550nm, 620 nm, 720nm
- (4) Throughput: up to 500 tests / hour
- (5) Data storage: memory capacity of 2000 recent test results
- (6) Printer: built-in thermal printer, external printer; ASCII RS232
- (7) Thermal Sensing Touch Screen: LCD 320 mm x 240 mm
- (8) Test parameters: Glucose (GLU), Urobilinogen (URO), Bilirubin (BIL), Specific Gravity(S.G), occult blood (BLD), pH, Protein (PRO), Nitrite (NIT), Leukocytes (LEU), Ascorbic Acid (AC)
- (9) Physical dimension: 350mm x 380mm x 182mm
- (10)Net Weight: 10kg

2.2 Measuring Principle

The entire system is controlled by microprocessor chips and the major components are:

- A) Sampling component
- B) LCD Screen
- C) Motor operation components
- D) Printer
- E) Control Keys

Diagram 1- Overall operational diagram

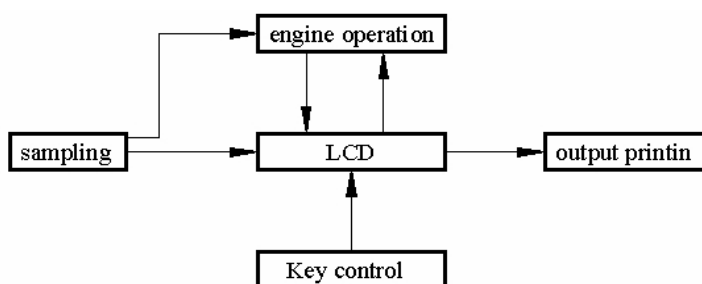
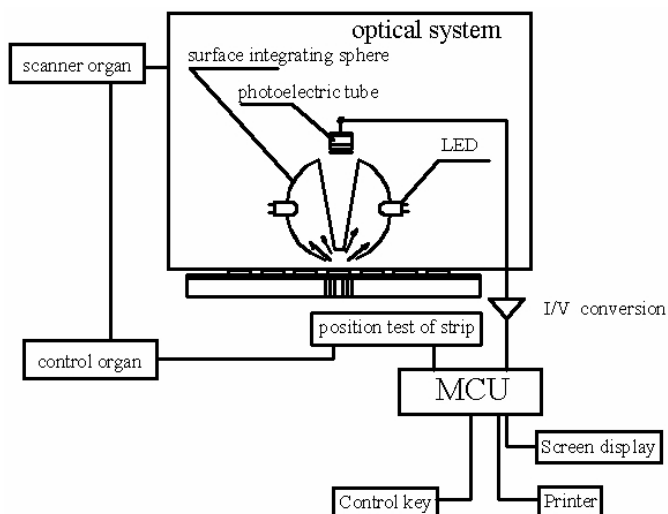


Diagram 2- Sampling Diagram



The TC-720PLUS can determine the intensity of different colours on the reagent strip test area. It measures colour intensity by irradiating the test pad with white light and detecting the reflectance on the test pad with an integrated sphere photo-detector. This photo-detector is filtered to measured wavelengths of 525nm, 550nm, 620nm, and 720nm. 720nm is the reference wavelength and the combination of 525nm, 550nm and 620nm lights are to differentiate the color intensity. Results are calculated by a reflection rate (R%) which is a percentage of the total reflectance of the testing wavelength and are printed automatically. If the intensity of colour on the strip is high then the reflectance will be low conversely if the intensity of the colour is low then the reflectance will be high.

Apart from there being strip blocks for each test there is also a reference block (blank) on the strips. Its function is to rectify any error that may be caused by the colour or the urine itself. The formula for reflectance is:

$$R(\%) = \frac{T_m \cdot C_s}{T_s \cdot C_m}$$

R : Reflectance

T_m : The intensity of reflected radiation of the strip block to testing wavelength

T_s : The intensity of reflected radiation of the strip block to reference wavelength

C_m : The intensity of reflected radiation of the reference block to testing wavelength

C_s : The intensity of reflected radiation of the reference block to reference wavelength



Please read the TC-720 Plus-720 PLUS Operator's Manual carefully before installation, to ensure proper operation of the analyser.

CHAPTER 3

INSTALLATION

3.1 Unpacking

Carefully remove the contents of the TC-720PLUS box and check for the following items:

Contents:

1. TC-720PLUS
2. European or British Power cord
3. Power Adapter 9V/ 4A
4. Roll of printer paper
5. Operator's Manual

3.2 Installation and Power-On Procedure

Components of the TC-720 PLUS

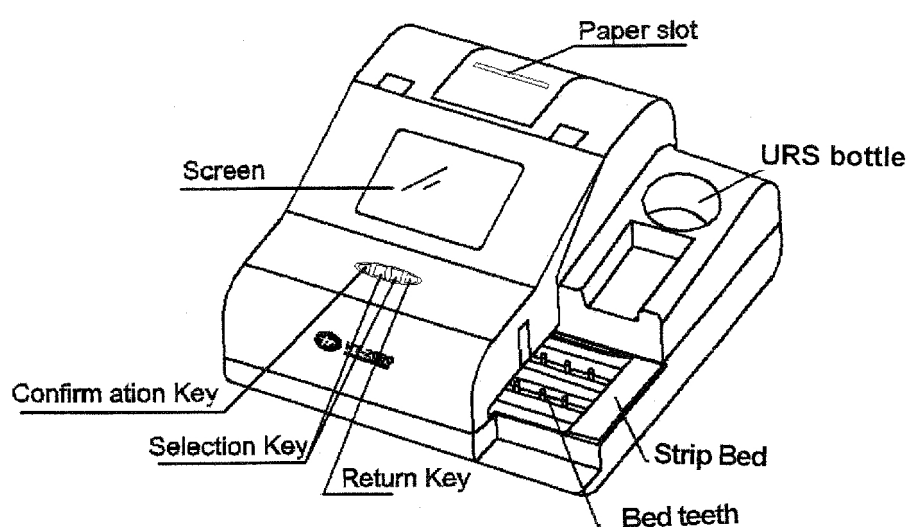


Figure 1: Front View

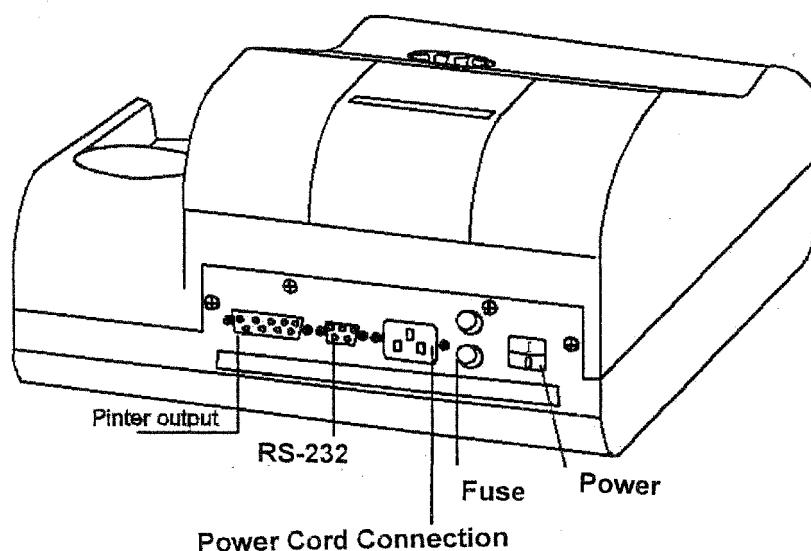


Figure 2: Rear View

Turning on the analyser

- (1) The TC-720PLUS should be placed on a clean, flat, stable surface. It should not be placed in an area exposed to direct sunlight, moisture, or electromagnetic interferences.
- (2) Testing area should meet all operational conditions stated in Chapter 2 including, humidity, power, temperature, and pressure.
- (3) The TC-720PLUS should be kept clean and should be protected from dust.
- (4) To connect the power cord to the power source (the power switch should be in the OFF position).
- (5) Switch on the power switch at the rear of the analyser.

Set-Up

(I) Installation of the TC-720 PLUS

When the analyser has been switched on, it will go through a series of self diagnostic checks. During this time malfunction codes will show if there are any problems with the analyser. Please refer to the service manual for further assistance.

Urine controls are recommended to verify the results against the ranges provided. If there is a deviation in the results, please report the result to technical support.



Caution:

Make sure that the current and voltage of the power supply is stable before use or the analyser may be damaged.



Figure 3: Startup Menu

If malfunction '9' appears during the instruments initial set up, it is possible that the strip platform is not properly in place and has shifted during transportation or the strip rack may have been blocked. The following procedure can be used to resolve this.

Press **YES** to enter into the main operational menu (see Figure 4), then press **△** or **▽** to choose Parameter Setting, press **YES** to enter into the menu (see Figure 7), then choose Move, press **YES** to enter into its operational interface; and then press **▽** or **△** to move the rack so that the test strip can be set for single-step or continuous movement; if the strip sending rack runs smoothly it indicates that the mechanical performance of the TC-720 PLUS is normal. Press **NO** repeatedly to return to Start Up menu.

Press the < Yes > button to display the Operational menu



Caution:

Do not disassemble the analyser while it is switched on, as this may cause damage.

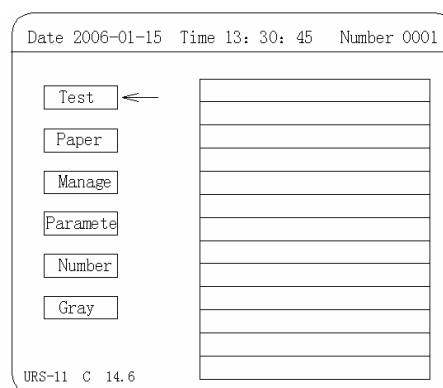


Figure 4: Operational Menu

(II) Touch Screen Calibration

The calibration procedure should be initiated before use.

At the startup screen, press  +  key to enter the operation menu. 'Press this dot' will blink. Use your index finger, and touch each dot. Press the  key to confirm and then  to exit.

(III) Changing Printer Paper

CAUTION:

- **Make sure the thermal paper is dry before installation. The printer will stop working if the thermal paper appears wet.**
- **The printer will not print if the wrong side of the thermal paper is inserted since it is coated on one side only.**
- **Do not run the printer without any thermal paper installed. The printer head may be damaged.**

Instructions for changing printer paper:

Turn on the TC-720 PLUS; remove the printer cover by applying steady upward pressure to the rear of the cover. Secure the printer paper in the printer bed and place one end of the paper under the rubber wheel. Lift up the puller rod as in Figure 5 and rotate the printer Knob to engage the paper. Close the puller rod.

Press  to enter main menu screen. On the menu screen toggle (using arrows) to Paper Feed and press , this will advance the paper. Make sure paper is advancing properly. Replace the cover making sure that the printer paper is placed through the slit on the cover.

After changing paper make sure that the printer is working correctly by running a “test” strip. If there is no print output the paper may have been installed with the wrong side facing the printer. Repeat the above procedure and turning round the roll of paper.

Diagram for Installation of Printer Paper

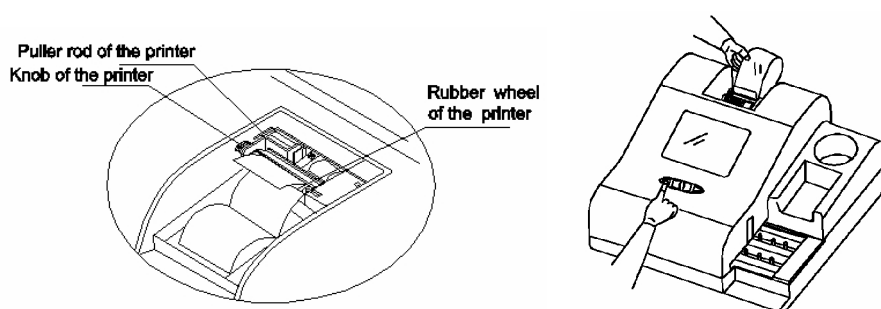


Figure 5: Paper Setting

3.3 Selection of strip type

From main menu select 'Parameter' and press **YES** to enter the operation menu. Scroll down to 'Strips' and press **YES** to enter into its operational interface, Press **▲** or **▼** keys to select strip type (URS-2K to URS-11). Press **NO** key to return to the previous menu to save changes.

Test strips are disposable product and cannot be used more than once



ATTENTION:

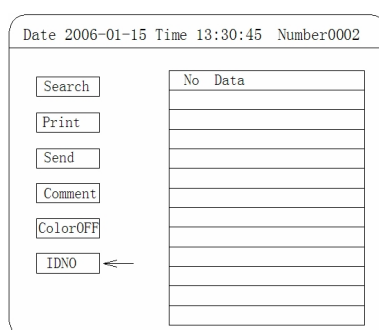
- 1) The analyser must be installed in a place where all safety requirements are met.
- 2) Regularly clean the analyser with soft tissue
- 3) Do not disassemble the analyser
- 4) Use clean containers for all urine samples
- 5) Use a fresh urine sample.
- 6) Concentrated urine samples must be diluted.
- 7) The test strip must be dipped completely into the urine. The dipping time must be strictly controlled at 2 seconds.
- 8) The analyser should be used at normal room temperature
- 9) **Do not** use any liquids to clean the touch screen. It must be cleaned using a dry soft tissue or proprietary cleaning cloths

CHAPTER 4

OPERATION INSTRUCTIONS

4.1 Id ON / Id OFF Setting

The TC-720 PLUS analyser has a sample ID number function. There is the option to turn this on or off from the Touch Screen. Enter the Data Management Menu interface by selecting “Manage” at the main menu, then Select ‘Id ON’ and press **YES** to turn off or press **YES** to turn on. Press **NO** to exit and to store selection. Ensure this function is switched ON before switching on Patient or Operator ID’s



The following print outs with ID ON and ID OFF are shown below

ID ON

ID=0000000001
 NO 0001
 Time 16:32:21
 GLU 1+
 BIL NEGATIVE
 KET NEGATIVE
 SG >=1.030
 BLD NEGATIVE
 PH 5.0
 PRO NEGATIVE
 URO 3.2umol/L
 NIT NEGATIVE
 LEU 2+

ID OFF

NO 0001
 Time 16:32:21
 GLU 1+
 BIL NEGATIVE
 KET NEGATIVE
 SG >=1.030
 BLD NEGATIVE
 PH 5.0
 PRO NEGATIVE
 URO 3.2umol/L
 NIT NEGATIVE
 LEU 2+

Figure 6: The Sample ID Sign Interface

4.2 Setting the Patient I.D. Number

In the main menu touch “Test” to enter the testing menu, and touch ‘PI’ on the screen to enter the key pad menu (figure 7). The Patient Number is entered by touching the numbers on the key pad displayed on the screen

Operation Functions of the Key pad:

- (1) “Del” can delete the ‘PI’ number set into the analyser
- (2) “Clr” can clear the ‘PI’ number from the screen
- (3) “Yes” will enter the ‘PI’ into the system and the next ‘PI’ can then be entered if running multiple patient samples

(4) "Quit" will escape from the key pad screen and back to the main menu screen

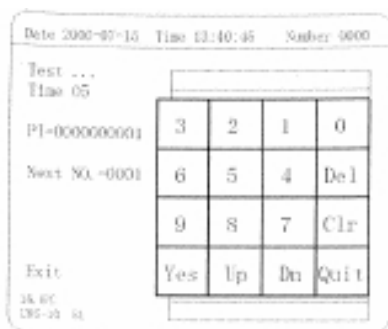


Figure 7: Patient ID Screen

4.3 Operator I.D. Number ON / OFF Setting

The TC-720 PLUS analyser has a sample ID number function. There is an option to turn this on or off for the Touch Screen function. Enter the Data Management Menu interface by selecting "Manage" at the main menu, then Select 'Id ON' and press **YES** to turn off or press **YES** to turn ON. Again, press **NO** to exit.



Figure 8: Operator ID Screen

4.4 Setting the operator I.D. Number

In the main menu touch "Test" to enter the testing menu, and touch the OI on the screen to enter the key pad menu (figure 7). The operator ID number is entered by touching the numbers on the key pad displayed on the screen.

Operation Functions of the Key pad:

- (1) "Del" can delete the OID number set into the analyser
- (2) "Clr" can clear the OID number from the screen
- (3) "Yes" will enter the OID into the system and other OI numbers can be entered if running multiple patient samples
- (4) "Quit" will escape from the key pad screen and back to the main menu screen

4.5 Setting the sample 'ID' Number

In the main menu touch "Test" to enter the testing menu, and touch the ID place to enter the number menu (figure 9). You may enter the sample ID number by touching the patient ID numbers on the key pad displayed on the screen.

Operation Functions of the Keyboard:

- (1)"Del" can delete the ID number set into the analyser
- (2)"Clr" can clear the ID number from the screen
- (3)"Yes" will enter the ID into the system and the next ID can be entered if running multiple patient samples at once
- (4)"Quit" will escape from the key pad screen and back to the main menu screen
- (5)"Up" will scroll through the number of patient ID's set into a computer if connected
- (6)"Dn" will scroll through the previous patient ID's set into a computer if connected

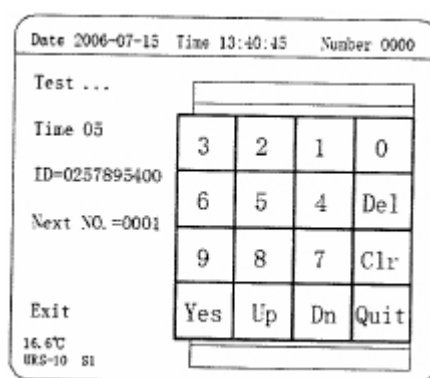


Figure 9: Sample ID Interface

4.6 Modification of the Sample I.D. Number

In the Operation Menu, touch "Manage" (or press ) , touch "Search" and then touch the display at the sample ID. Here you can search for any previously entered sample ID's to change the ID or remove it from the set of ID's you expect to run.

4.7 Operation Methods of the TC-720 Plus

Once the analyser is turned on and the self diagnostics is complete. Press **YES** to enter the main operational menu. Press **NO** to enter previous menu.

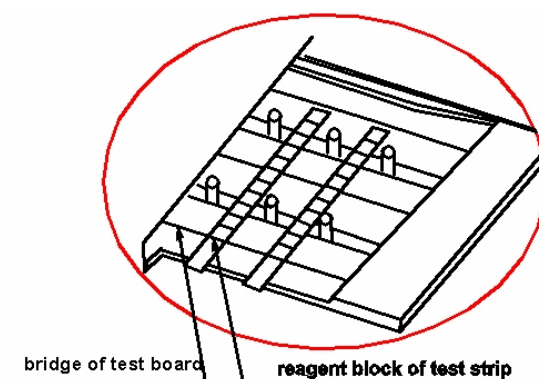


Figure 10: Correct Strip Loading



Place the urine test strips in the rack position exactly as shown in figure 10 above to prevent the analyser from jamming.

4.8 Testing a Strip

In the main menu, using the arrow keys select 'test' and press **YES**. At this time the analyser will beep a series of times. Dip the test strip into the urine for no more than 2 seconds making sure the urine comes into contact with all test pads. Blot the strip on an absorbent piece of paper and place on the strip rack ensuring the end of the strip just touches the back of the test board.

- A) Do not dip the urine strip in urine for too long as this may affect the results.**
- B) After sampling, immediately place the urine test strip on the analyser test board. Delays may cause the test pads to darken giving false negative or highly abnormal results.**
- C) The test strip is a consumable - do not attempt to reuse**
- D) If a MALFUNCTION occurs during a test, check the trouble shooting section of the manual to fix the problem and rerun the test.**

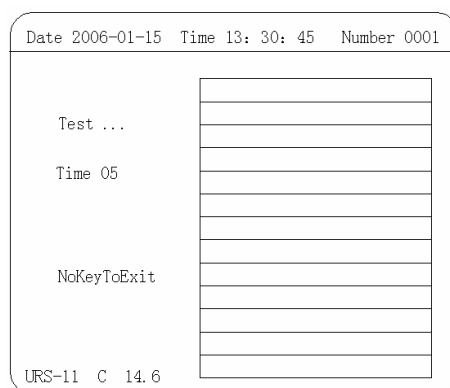


Figure 11: Pre results screen

The test rack will begin to rotate and the strip will enter the analyser. At this time the analyser will again beep several times. Dip the next urine strip into the next sample, for 2 seconds, blot on absorbent paper to clean off excess urine and place in the next appropriate rack position on the analyser. After 5 seconds the analyser will beep again and the test strip will enter the analyser. The strip rack will move one position every 5 seconds and will move the strip along the strip carrier (conveyer belt) until it reaches the reading position after 60 seconds. The strip will then be read and the results will be printed.

- (1) Please read the instructions on how to handle Urine Reagent strips located in the package insert included with each bottle of Urine Reagent Strips.**
- (2) The urine test strip is a one-use product and must only be used once.**



SPECIAL DIRECTIONS

Do not move the analyser while a test is running. This will cause the analyser to malfunction.

The TC-720 Plus analyser will begin to test the first test strip after 60 seconds and can test one test strip every 5 seconds thereafter.

The analyser will automatically keep the data for all test results, and synchronously display and print these test results

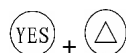
The analyser can continuously load strips with the conveyer belt test strip carrier. When the analyser is in test mode and is testing simply place a test strip in the next position to run a test.

If testing is completed or the testing in process needs to be stopped, exit from the test status can be achieved by pressing

and holding  for 2 seconds. The main operation menu will then be displayed.

4.9 Setting the Buzzer Volume

Buzzer volume can be changed by pressing:



+



= Will increase the volume



+



= will decrease the volume

4.10 Setting Test Number

The analyser holds a record of the test number that is currently being performed. This number is printed out on the top of the printed report and is displayed on the screen at the bottom right corner. This number can be set to start at any point from 0001 –

9999. From the main menu choose “Number” by scrolling down the selection arrow and press . The number set will be

seen flashing. Press  or  to change to the required number. Holding down the arrows will make the numbers increase or decrease rapidly.

(1) Press  to set the number

(2) Press  or  once will increase or decrease the number by 1.

(3) Press  +  will delete all data

4.11 Setting Printer Function, English, Date, Time, and Data

From the Operation Main Menu, and using the arrow keys, choose “Parameter” by pressing  (or touch “Parameter” on the touch screen). The options to set strip type, printer setting, date, time and data input and output are displayed

(I) Print On

The default printer setting for the analyser activates the internal thermal printer. The analyser can also be set to use an external printer. These settings can be changed using the “Print On” function in the Parameter Menu. When using an external printer the status of the printer cannot be controlled using the TC-720 Plus analyser. The printer must be appropriately set up to communicate with the analyser.

“Print On” – Means the TC-720 Plus will print from the internal thermal printer

“Print Off” – Means the TC-720 Plus will not print from the internal printer but send the results to an external printer linked to the TC-720 Plus analyser

(II) English

The default language setting for the TC-720 PLUS is English.

The Standard Print format is as follows:

```

No 0001
Date 2003-06-02
Time 17:25
GLU      500  mg/dl
BIL      LARGE
KET      >=  80 mg/dl
SG       1.025
BLD      LARGE
PH       7.5
PRO      100  mg/dl
URO      >=  8.0 EU/dl
NIT      POSITIVE
LEU      LARGE

```

Figure 12: Print Format

To change the Units see section **(V111)** below

(III) Setting the Date

Choose "Date" in the Parameter Menu and press  to shift between year, month, or day (or touch the year, month, or day at the top left of the screen). The  or  buttons will increase or decrease the date selected. You may also use the key pad shown on the screen to set the number of the year, month or day.

(IV) Setting the Time

Choose "Time" in the Parameter Menu and press  to shift between hour, minute or second (or touch the hour, minute or second at the top of the screen). The  or  will increase or decrease the time parameter selected. You may also use the key pad shown on the screen to set the number of the hour, minute or second.

(V) Setting the Data Input / Output

In the Parameter Menu choose "Baud Rate" using the arrow keys and then press . By using the arrow keys you can choose different "Baud Rates" (300, 600, 900, 1200, 4800, 9600, 19200, 38400, 57600, 115200). Pressing  after the "Baud Rate" has been set the system will return to the Parameter Menu.

(VI) Move

The **"Move"** item in the TC-720 PLUS menu is used in TC-720 PLUS maintenance. Choose "Move" in "Parameter" menu and press  and enter into its operational menu (Figure 13) where control of the running conditions of each motor using the keypad can be carried out.

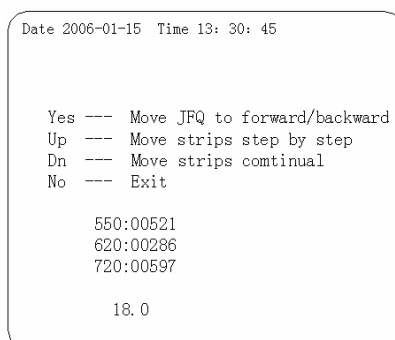


Figure 13: Operational Interface in Motor drive

(VII) Strips

The TC-720PLUS maintains a record of each test number. This number is printed out on the top of the report and is displayed on the screen in the bottom right corner. This number can be set to start at any point between 1-0999.

From the main menu choose **"Parameter"** by scrolling the selection arrow to **"Parameter"** and pressing .

Choose **"Strips"** in this menu. The number setting will flash. Using the  or  arrows change the flashing number as required. Holding down the arrows will make the numbers increase or decrease in increments of 10.

Press  to return to the Main menu. The first test will start at the number set by the user. Each test after this will increase by one from the set point.



When a new start number is set the data saved on previous numbers will be overwritten by the new data and lost.

(VIII) Units

To change the units in the analyser, from the Main Menu screen hold down  and press  to change from C1 → C2 → S1 → S2. The Units are displayed in the bottom left corner of the screen next to the Temperature reading of the analyser.

NOTE: Conventional and SI Units are shown on pages 30 and 31

CHAPTER 5

MANAGEMENT INSTRUCTIONS

5.1 Data Management

In the main operation menu choose **"Manage"** and press **YES** to enter into the menu (Figure 14), Test data can be managed from **"Search, Print, Send, & Comment"**. Note: every time **NO** is pressed, the TC-720 PLUS analyser will return to the previous menu,

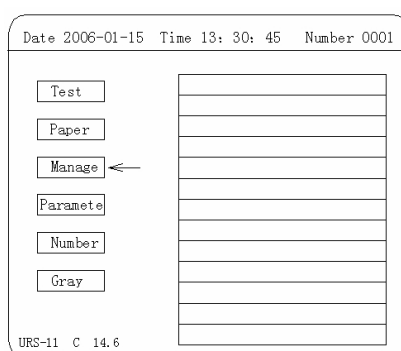


Figure 14: Manage Menu

(I) Search

Specific data can be found using the **"Search"** operational interface. There are three search methods as follows:

- Press **YES** + **NO** simultaneously and the year in the date (e.g. 2008) flashes. Press **YES**, the month in the date flashes. By pressing **YES** switch between 'Year' 'Month' and 'Day', then press key **△** or **▽** to set the date that is required for search purposes. Press **YES** and the Number for the test data will flash (Figure 15).

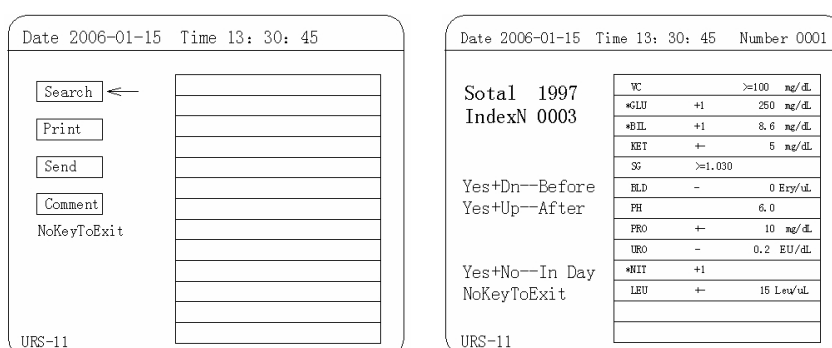


Figure 15

- Press **△** + **▽** to set the number for the data that is required.

- Press **YES** + **NO** simultaneously, and then press **△** or **▽** to view all test data on the displayed date of the TC-720 PLUS analyser.

△ If there is no test data on the requested date, the analyser will display no data. (See Figure 16)

Date 2006-01-15 Time 13: 30: 45 Number 0001	
Not Found	
Sotal 1997	
IndexN 0003	
Yes+Dn--Before	
Yes+Up--After	
Yes+No--In Day	
NoKeyToExit	

Figure 16

(II) Printing Data

If printed data is required print the data from the “**Search**” operational interface press ‘Print’ on the top right of the screen or press **NO** to go back to the “**Manage**” menu. Choose “Print Data” to enter the operational menu. Select printing requirements by pressing **△** or **▽**, and choose the sample ID number and then press **YES**.

Count 0001	Number 0001
Yes -- Print	
Up -- Plus one	
Dn -- Minus one	
NoKeyToExit	

Figure 17

(III) Sending Data

The TC-720 PLUS analyser can send selected test data to a computer after using the search function. Press **NO** to go back to the management menu and choose **"Send"** to enter into the operational interface (Figure 18). Data to be sent can be selected by pressing **△** or **▽**. Press **YES**, to send the data to a computer

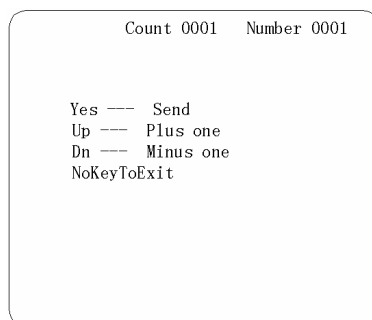


Figure 18

(IV) Comment

Choose **"Comment"** in the management menu and press **YES**. The screen will display the technical information for the analyser (Figure 19)

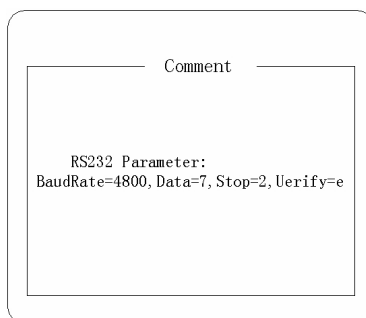


Figure 19

(V) Setting Urine Color

The analyser can detect urine color when the printer is set to print urine color. Enter the Data Management Menu to set **"Color On"** or **"Color Off."**

"Color On" – Means that the color will print on all results

"Color Off" – Means that the color will not print on all results

(VI) Time

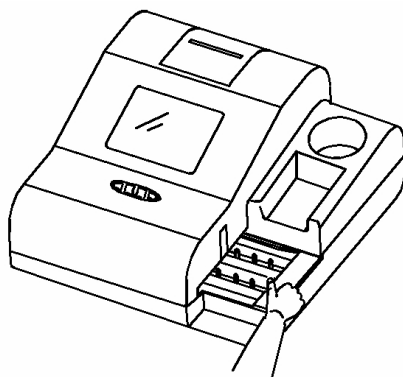
Adjust hour, minute and second in the **"Time"** menu.

CHAPTER 6

MAINTENANCE

6.1 Routine Cleaning

The TC 720 plus analyser must be maintained properly in order to insure proper operation.



CAUTION: Do not use organic solutions such as alcohol, or acetone, etc to clean the reagent strip assembly. It must be cleaned and wiped using soft tissues or gauze.

6.2 Daily Maintenance

(I) Test platform

Clean the urine strip platform everyday according to the following procedure:

1. Switch off mains power to the analyser and carefully pull out the test platform.
2. Clean the platform using only clean water and a soft tissue.
3. Dry the platform using a dry tissue or allow it to dry naturally.
4. Replace the test platform and turn on the analyser to ensure it is functioning properly.

(II) Urine Strip Waste Box

The waste container should also be cleaned daily using the following procedure:

1. Remove the waste container and dispose of used strips according to laboratory procedures.
2. Thoroughly wash the box in clean water and dry using a soft tissue.
3. Replace the container in the analyser.

CHAPTER 7

ERROR MESSAGES and TROUBLESHOOTING

The following is a short guide to troubleshooting problems associated with the TC-720PLUS analyser.

If there is a malfunction and an error code is displayed please refer to the table below. If there are problems with the analyser that are not covered in this section or if this guide does not cure the problem please contact the manufacturer or distributor. Do not attempt to repair the analyser without guidance of the distributor or manufacturer.

(I) Screen does not turn on

A. The screen may have no display if the back light is not properly set. Press and hold  , then use  or  to adjust the brightness of screen.

B. If the power requirements are not to specification as outlined in this manual, or if the power is not connected correctly the analyser will not turn on. Make sure that the power requirements are met and that the power connections are secure.

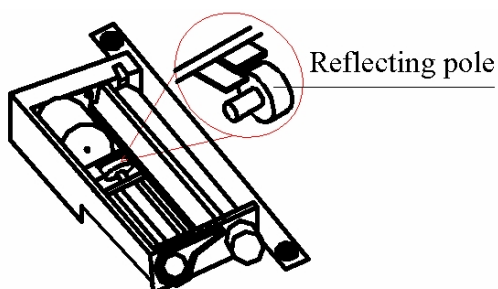
C. Check whether the fuses at the back of the TC-720 PLUS analyser are still functional.

(II) The thermal printer does not work.

A. Make sure the thermal printer has paper.

B. Make sure the printer paper is installed correctly. If the paper is installed with the wrong side facing the thermal heads then the printer will not print. Reinstall the paper with the reverse side facing the heads.

C. If the reflecting pole of the thermal printer is dirty, then the printer will not work properly. Clean the reflecting pole with a soft tissue.



D. Make sure that the printer is set to print. This is done from the “**Parameter**” menu and the printer setting should be set to “**Print On**”

CAUTION: Do not open up the analyser and remove any of its parts other than what is mentioned above or damage to the analyser may be caused.

(III) The TC-720 PLUS Analyser Stops Testing

If the TC-720 Plus analyser stops during testing switch the analyser off immediately. Open the front cover by hand to view the test strip platform. The strip platform may have acquired some debris or test strips may have become jammed causing the conveyer belt to stop moving. Remove any debris or strips stuck in the conveyer belt.

When cleared of all debris or obstructions enter the Main Operational Menu and enter the Parameter Menu. From here choose "Parameter Setting" and then "Move." Use the   keys to move the rack. If the rack moves smoothly it indicates that the mechanical performance of the apparatus is normal. Press  to return to the main operation menu.

Error Codes

ERROR code	Description	TC-720 PLUS status	Reason	Solution
Error 0	(Wrong E-PROM Data)	Off Status	Wrong E-PROM Data	Contact Supplier
Error 1	(Light too bright)	Off Status	Optical system requires attention	Contact Supplier
Error 3	(Improper Strip placement)	Testing not carried out	Misplaced strip	Replace the test strip correctly
Error 4	(Weak light response)	Off status	Optical system needs attention Abnormal sample color Misplaced strip Dirty test board	Contact Supplier Replace the sample and repeat the test Replace the strip correctly Clean the test platform
Error 7	(Incorrect strip type)	Pause status	Incorrect strip type Strip color is too dark The TC-720 PLUS requires service repair	Use correct strip type Verify the voltage of power supply
Error 8	(Will not test continually)	Off Status	The test platform is fouled with debris or test strips Error Code 6 continually appears	Clean the test platform Resolve previous malfunctions
Error 9	(Motor limitation control is lost)	The TC-720 PLUS will not process samples	Incorrect test platform position	Reposition of the test platform
Error B	(Incorrect Test Strip type selected)	The TC-720 PLUS will not process samples	Test strip is not recognized by the analyser	Use the test strip type that has been programmed into the analyser

CHAPTER 8

DATA COMMUNICATION INTERFACE

8.1 Interfacing

The TC-720 PLUS can transmit data through the RS232 interface port at the rear. Connection to a computer can be made by using the appropriate cable available from the manufacturer.

Follow the directions below to connect to an external computer:

(I) Serial Port

- Serial interface output: Standard RS232 level signal
- Data code: ASCII
- Output time: Results transmitted after printing
- Output format: 4800 baud rate, data 7 figures, stop 2 , even
- Output loop: photoelectric ionization.



Standard 9 pin computer tandem outlet should be used for the tandem outlet cable. “2” pins are for the Output signal; “3” are for the Input signal and 5 pins are ground.

(II) Parallel port:

- Standard 25 pin parallel printer interface.

Appendix 1

TABLE of RESULTS (1)

Test	Abbreviation	Units	Printed/Displayed Results					
			Normal System			+ / - System		
Glucose	GLU	mg/dL	NEGATIVE	500		NEGATIVE	2+	
			100	≥ 1000		TRACE	3+	
			250			1+		
Bilirubin	BIL		NEGATIVE	MODERATE		NEGATIVE	2+	
			SMALL	LARGE		1+	3+	
Ketone	KET	mg/dL	NEGATIVE	40		NEGATIVE	2+	
			TRACE	≥ 80		TRACE	3+	
			15			1+		
Specific Gravity	SG		≤ 1.005	1.020		≤ 1.005	1.020	
			1.010	1.025		1.010	1.025	
			1.015	≥ 1.030		1.015	≥ 1.030	
Blood	BLD		NEGATIVE	MODERATE		NEGATIVE	2+	
			TRACE	LARGE		TRACE	3+	
			SMALL			1+		
pH	pH		5.0	7.0	8.5	5.0	7.0	8.5
			6.0	7.5		6.0	7.5	
			6.5	8.0		6.5	8.0	
Protein	PRO	mg/dL	NEGATIVE	100		NEGATIVE	2+	
			TRACE	≥ 300		TRACE	3+	
			30			1+		
Urobilinogen	URO	E.U./dL	0.2	4		0.2	4	
			1	≥ 8		1	≥ 8	
			2			2		
Nitrite	NIT		NEGATIVE	POSITIVE		NEGATIVE	POSITIVE	
Leukocytes	LEU		NEGATIVE	MODERATE		NEGATIVE	2+	
			TRACE	LARGE		TRACE	3+	
			SMALL			1+		
Ascorbic Acid	VC	mg/dL	NEGATIVE	50		NEGATIVE	2+	
			10	≥ 100		TRACE	3+	
			25			1+		
Color			YELLOW	GREEN		YELLOW	GREEN	
			ORANGE	BLUE		ORANGE	BLUE	
			RED	BROWN		RED	BROWN	

CONVENTIONAL UNITS

TABLE of RESULTS (2)

Test	Abbreviation	Units	Printed/Displayed Results					
			Normal System			+ / - System		
Glucose	GLU	mmol/L	NEGATIVE	28		NEGATIVE	2+	
			5.5	≥ 55		TRACE	3+	
			14			1+		
Bilirubin	BIL		NEGATIVE	MODERATE		NEGATIVE	2+	
			SMALL	LARGE		1+	3+	
Ketone	KET	mmol/L	NEGATIVE	3.9		NEGATIVE	2+	
			TRACE	≥ 7.8		TRACE	3+	
			1.5			1+		
Specific Gravity	SG		≤ 1.005	1.020		≤ 1.005	1.020	
			1.010	1.025		1.010	1.025	
			1.015	≥ 1.030		1.015	≥ 1.030	
Blood	BLD	Ery/ μ L	NEGATIVE	Ca 80		NEGATIVE	2+	
			TRACE	Ca 200		TRACE	3+	
			Ca 25			1+		
pH	pH		5.0	7.0	8.5	5.0	7.0	8.5
			6.0	7.5		6.0	7.5	
			6.5	8.0		6.5	8.0	
Protein	PRO	g/L	NEGATIVE	1		NEGATIVE	2+	
			TRACE	≥ 3		TRACE	3+	
			0.3			1+		
Urobilinogen	URO	μ mol/L	3.2	64		3.2	64	
			16	≥ 128		16	≥ 128	
			32			32		
Nitrite	NIT		NEGATIVE	POSITIVE		NEGATIVE	POSITIVE	
Leukocytes	LEU	Leu/ μ L	NEGATIVE	Ca 125		NEGATIVE	2+	
			Ca 15	Ca 500		TRACE	3+	
			Ca 70			1+		
Ascorbic Acid	VC	mmol/L	NEGATIVE	3		NEGATIVE	2+	
			0.6	≥ 6		TRACE	3+	
			1.4			1+		
Color			YELLOW	GREEN		YELLOW	GREEN	
			ORANGE	BLUE		ORANGE	BLUE	
			RED	BROWN		RED	BROWN	

S I UNITS